Zootaxa 4208 (6): 594–599
http://www.mapress.com/j/zt/

Correspondence

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

https://doi.org/10.11646/zootaxa.4208.6.7
http://zoobank.org/urn:lsid:zoobank.org:pub:65C3E675-5960-4A87-BB8F-94E1B5623EEA

Replacement names for two homonyms of *Liothrips brevitubus* Karny: one from California, the other for a species damaging *Jatropha* crops in Mexico

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There are nearly 280 species of *Liothrips* listed from around the world (ThripsWiki 2016), all of them presumably feeding and breeding on the leaves of higher plants, and sometimes inducing or being associated with galls (Mound 1994). Despite this, for most of these species the identity of the plant species on which they are dependent is rarely known, and a particularly high proportion of the species are based on few specimens or even single individuals (cf Table 1). As a result, the identity of many of these named species continues to be in doubt. Modern identification keys are available only to the 23 *Liothrips* species known from Japan (Okajima 2006), the four European species known from Iran (Minaei & Mound 2014), and 14 species from Illinois (Stannard 1968). In contrast, the keys to 16 species of *Liothrips* from Brazil (Moulton 1933), to more than 80 species from Indonesia (Priesner 1968), and to 50 species from India (Ananthakrishnan & Sen 1980), are of little more than archival interest, in that they are based on few specimens with little allowance for intraspecific variation. Mound & Marullo (1996) listed over 80 *Liothrips* species from the Americas, although some of these are now placed in *Pseudophilothrips* (see Mound *et al*. 2010). That list included two homonyms of the Indonesian species *Liothrips brevitubus* Karny, one from Mexico and one from California. The homonym from Mexico is here recognised as applying to a species that in 2015 caused severe damage to a crop of *Jatropha curcas* in Chiapas. The objectives here are to provide a valid name for this pest, to facilitate its recognition among the 13 species of *Liothrips* recorded from Mexico (Table I), and also to replace the homonym from California.

Liothrips species of economic interest

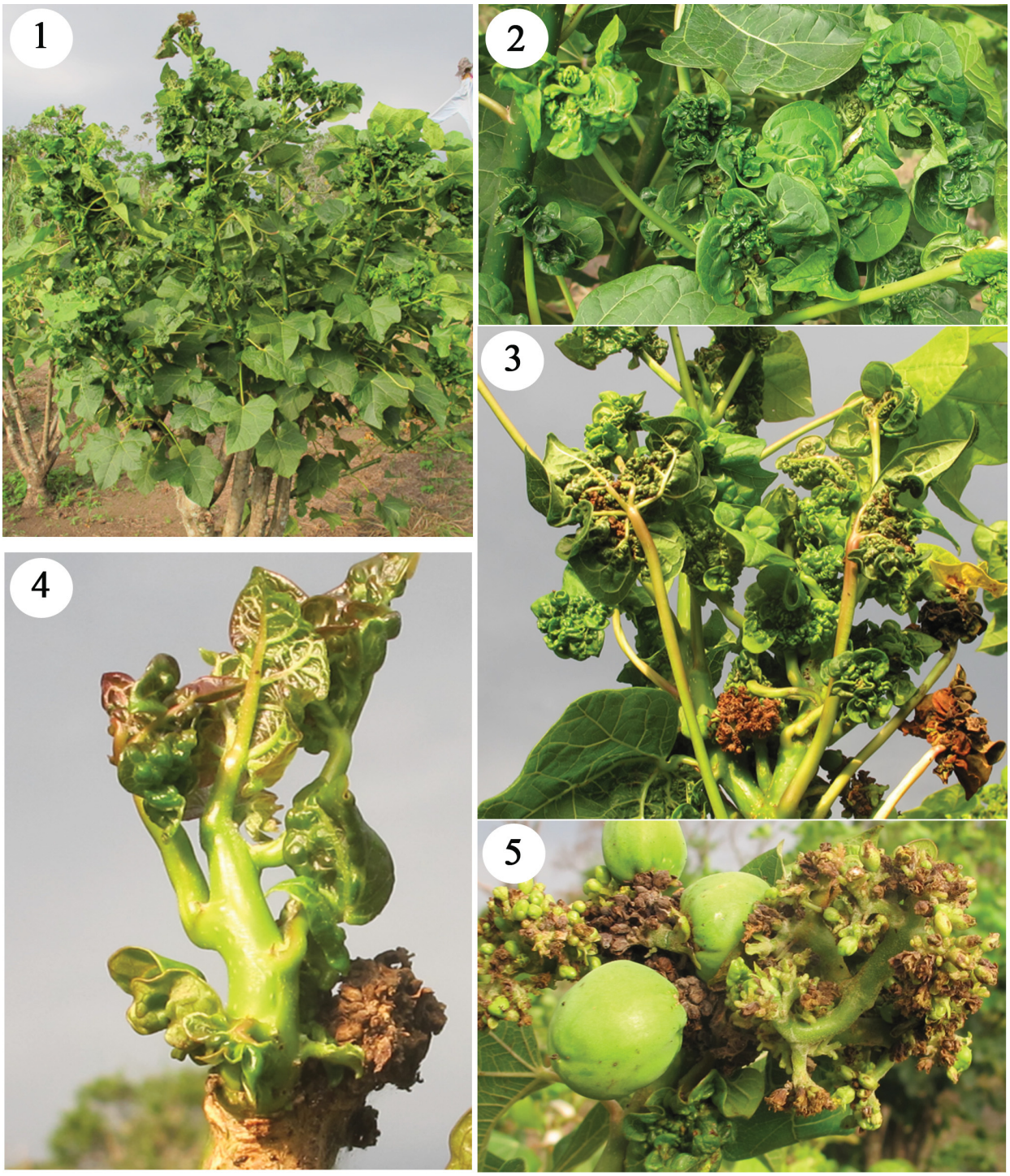
The most widespread *Liothrips* of economic importance is *L. vaneeckei*, the lily-bulb thrips that was described from Europe but which has been moved around the world by the horticultural trade in bulbs and orchids. Three other species of *Liothrips* have also been reported as localized plant pests. *Liothrips oleae* is a pest of olive trees in the European Mediterranean countries (Moritz *et al*. 2004). *Liothrips adisi* was described as a pest of the commercial liane *Paullinea cupana* in Brazil, and *Liothrips austriacus* has been implicated as a pest of *Pistacia* crops in Iran (Minaei & Mound 2014). In addition, three species in this genus have been investigated as biocontrol agents of weedy plants, *L. urichi* against *Clidemia hirta* (Simmonds 1933), *L. mikaniae* against *Mikania micrantha* (Cock 1982), and *L. tractabilis* against *Campuloclinium macrocephalum* (Mound & Pereyra 2008). The species of *Liothrips* reported here as damaging *Jatropha* in Mexico is of considerable potential interest in economic entomology because of increasing interest in the cultivation of *Jatropha* as a profitable crop.

Thrips damaging *Jatropha curcas*

Jatropha curcas is a perennial flowering plant that is cultivated primarily for its high oil content seeds. These are used in cosmetics and medicine, and are also important as a source of "biodiesel". Cultivation of the crop is increasingly encouraged in Latin America, Africa and Asia. For further development of such crops, studies are needed on suitable agronomic practices and on the importance of pests. Currently, the only thrips reported as damaging this crop are leaf-feeding members of the Panchaetothripinae, including *Selenothrips rubrocinctus* in Brazil (Resende *et al*. 2012), *Retithrips syriacus* in India (Anitha & Vareprasad 2012), and *Heliothrips haemorrhoidalis*, *Rhipiphorothrips cruentatus*, *Selenothrips rubrocinctus* and *Zaniothrips ricini* in Indonesia (Asbani & Sartiami 2011). In contrast, in Chiapas State,

 Accepted by A. Cavalleri: 4 Nov. 2016; published: 21 Dec. 2016

Mexico during 2015, the leaves of a *Jatropha* crop growing in a 5 hectare experimental orchard were found to be seriously distorted (Figs 1–5). These malformations were induced by large populations of the blackish-brown Phlaeothripidae species that is discussed further below. The plants were pruned late in November, and the first leaves appeared early in December soon after the rains ceased, and were quickly infested by the thrips. Malformations were induced on the young leaves, but infested terminal buds developed multiple branches into "witches broom" structures. Preliminary results suggest that the large infestation reduced the numbers of fruits produced by the crop, but further studies are needed to determine the economic losses to this thrips. Later in the season, pirate bugs (*Orius* sp., Anthocoridae) were found feeding on the thrips, and also observed were several adults of a *Leptothrips* species (Phlaeothripidae) that may also be predatory.



FIGURES 1–5. *Jatropha curcas* damaged by *Liothrips jatrophae*. **1.** Whole plant. **2.** Terminal rosettes. **3.** Distorted leaves. **4.** Stunted plant apex. **5.** Fruits.

Liothrips species in Mexico

Although 13 species of *Liothrips* are listed from Mexico, there is no key available by which these can be identified. Thus in order to identify the thrips from *Jatropha* it was necessary to compare the original descriptions of each of these 13 species. As indicated in Table 1, ten of these species were described as having at least antennal segment III clear yellow or even bright yellow, whereas the species on *Jatropha* has this segment largely brown. Of the three species with segment III not yellow, *bibbyi* and *mexicanus*, were described as having this segment shaded brown on the outer edge, and a third species, *brevitubus*, was described as having segment III "yellow in first and third quarters but brown in second and fourth quarters". The thrips from *Jatropha* was noted as having a small tooth on the fore tarsus, an unusual condition among species of the genus *Liothrips*. This condition is shared by only three of the species known from Mexico, *parcus*, *mexicanus* and *brevitubus*. However, the apex of the femora as well as the base and apex of the tibiae were described as bright yellow for *parcus*, and this distinguishes that species. Similarly, *mexicanus* is distinguished because it was described as having the fore wings with a dark median band extending along two-thirds of the wing. In contrast, details in the description of *brevitubus* are closely similar to the species from *Jatropha*, and moreover the original description states that the specimens were found "deforming the leaves of an unknown plant". To confirm the identification, type material of *brevitubus* was obtained on loan, although a further complication arises from the name being preoccupied within the genus. A new name is therefore proposed here, and a new description and illustrations of the species are provided to facilitate recognition of this pest.

Liothrips jatrophae nom.nov.

Rhynchothrips brevitubus Moulton, 1929: 19. Homonym of *Liothrips brevitubus* Karny, 1912: 156.

Female macroptera. Body, legs and antennae dark brown, antennal segment III with irregular paler areas (Fig. 9); major setae mainly brown; distal two-thirds of fore wing pale, basal third weakly shaded but brown around sub-basal setae; clavus brown.

Antennae typical of genus but relatively short, with one sense cone on segment III and three on IV. Head dorsally longer than wide (Fig. 7), first ocellus overhanging interantennal projection; postocular setae weakly capitate, shorter than dorsal eye length; maxillary stylets close together in middle of head, retracted anterior to postocular setal bases; mouth cone 30% longer than dorsal head length, extending to mesopresternum.

Pronotum transverse (Fig. 8), smooth medially with median longitudinal apodeme, reticulate near anterior and posterior margins; posteroangular and epimeral setae longer than the other three pairs; all weakly capitate. Mesonotum transversely reticulate, lateral setae small. Metanotum reticulate, median setae long and pointed (Fig. 11). Fore tarsus with short, broadly-based tooth (Fig. 6). Fore wing with 10–12 duplicated cilia; sub-basal setae capitate, arising in a straight line. Prosternal ferna widely separated; mesopresternum reduced to two slender triangles; metathoracic sternopleural sutures variable from short to long.

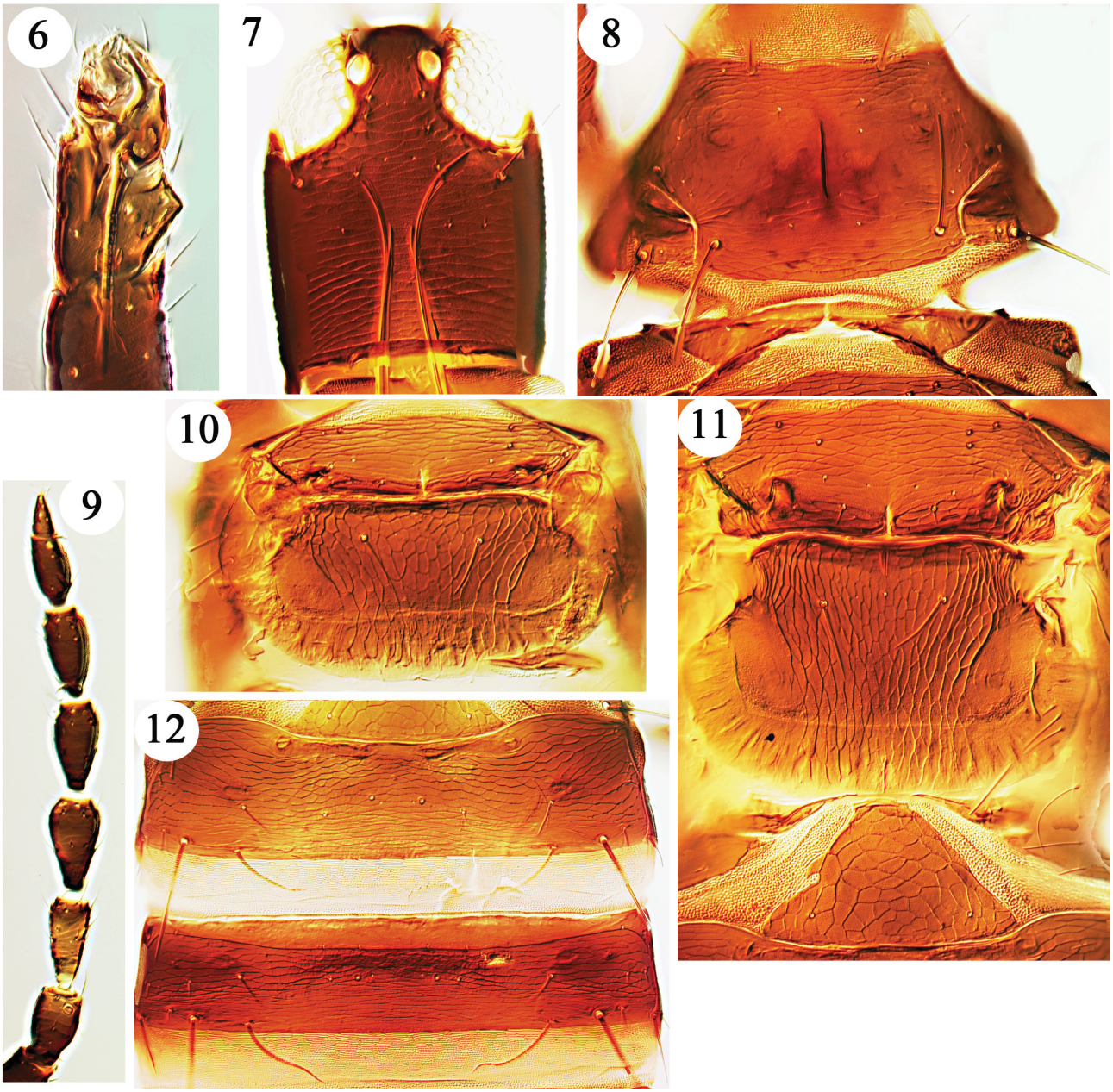
Pelta triangular (Fig. 11), reticulate, recessed slightly into tergite II, with paired campaniform sensilla; tergites II–VII each with two pairs of wing-retaining setae, but anterior pair on each tergite smaller than posterior pair (Fig. 12); tergites transversely reticulate; tergite IX setae S1 shorter than tube.

Measurements (Female macroptera in microns). Body length 2300. Head, dorsal length 225; width across cheeks 195; ventral length to mouth cone apex 500; postocular setae 65. Pronotum, length 160; width 280; major setae: am 40, aa40, ml 45, epim110, pa 95. Mesonotal lateral setae 35. Metanotal median setae 60. Fore wing length 900; sub-basal setae 35, 50, 65. Tergite IX setae S1 95, S2 100. Tube length 155. Antennal segments III–VIII length 70, 70, 68, 68, 55, 30.

Female microptera. Very similar to macroptera, ocelli well developed; metascutum more transverse (Fig. 10); fore wing lobe 160 microns.

Male macroptera and microptera. Similar to female but smaller; fore tarsal tooth scarcely larger; sternite VIII largely occupied by pore plate; tergite IX setae S2 stout and 60% as long as S1.

Specimens studied: **Mexico**, Sinaloa State, Mazatlan, paratype female microptera of *brevitubus* Moulton, from deformed leaves of unknown plant, 26.vii.1927 (Ferris), in The Natural History Museum, London. **Mexico,** Chiapas State, Tapachula, 3 female, 2 male macropterae, 9 female, 7 male micropterae, from distorted leaves of *Jatropha curcas* [Euphorbiaceae], 13.i.2015 (A. Goldarazena), in Australian National Insect Collection, Canberra, and the Natural History Museum, London.



FIGURES 6–12. *Liothrips jatrophae*. **6.** Female fore tarsal tooth. **7.** Head. **8.** Pronotum. **9.** Antenna. **10.** Meso and metanota of micropterous female. **11.** Meso and metanota, and pelta of macropterous female. **12.** Tergites II–III of macropterous female.

***Liothrips konoi* nom.nov.**

Liothrips brevitubus Kono, 1964: 4. Homonym of *Liothrips brevitubus* Karny, 1912: 156.

This species remains known only from the original three micropterous females listed below. The species was described as "apterous", although the fore wing lobe is clearly visible, 180 microns long, deeply shaded and bearing three stout black sub-basal setae. These setae are similar to the postocular and pronotal having the apices paler and smoothly spoon-shaped rather than capitate. In the original description the species was compared to *lepidus* Cott, but that species is known only from macropterae, as are most of the 11 species of *Liothrips* recorded from California (Hoddle *et al*. 2012). There is a possibility that the *brevitubus* specimens might eventually be recognised as micropterae of one of the other species based on macropterae, but a new name is proposed here to avoid confusion with the species from Indonesia.

Specimens studied: **California**, Calexico, holotype and two paratype female micropterae of *brevitubus* Kono, from willow, 12.iii.1945, in California Department of Food and Agriculture collection, Sacramento.

TABLE I. *Liothrips* species from Mexico

Species	Author & date	Original genus	Fore tarsal tooth	Antennal segments yellow	Type series F= female M= male
antennatus	Priesner, 1933	Liothrips	Absent	III	2F
arrogantis	Johansen, 1978	Liothrips	Absent	III-VI	11F 1M
aztecus	Johansen, 1981	Liothrips	Absent	III (IV-V)	1F
bibbyi	Watson, 1923	Liothrips	Absent	_	2F
brevitubus	Moulton, 1929	Rhynchothrips	Present	_	12F 3M
colimae	Moulton, 1929	Liothrips	Absent	III-VI	2F 2M
macgregori	Johansen, 1978	Liothrips	Absent	III	1F
matudai	Johansen, 1981	Liothrips	Absent	III	1F
mexicanus	Moulton, 1929	Hoplothrips	Present	_	21F
parcus	Johansen, 1978	Rhynchothrips	Present	III	3M
querci	Moulton, 1929	Liothrips	Absent	III-VI	3F 3M
tabascensis	Johansen, 1976	Liothrips	Absent	III	2F 6M
umbripennis	Hood, 1909	Phyllothrips	Absent	III-IV	"Many"

Acknowledgements

We are grateful to Paul Brown (Natural History Museum, London) and Natalia von Ellenrieder (Insect Collection, California Dept of Food and Agriculture, Sacramento) who kindly sent on loan to Canberra slides of thrips in the collections for which they are responsible. We are also grateful to Francisco Infante (Chiapas, Mexico) for providing us with copies of papers concerning thrips from Mexico.

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